

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L27	68	expand\$2 same contract\$2 and annuloplast\$	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2005/03/21 13:51
L28	0	("2003/0040793").URPN.	USPAT	OR	ON	2005/03/21 13:31
L29	4	stretch\$2 same release\$2 and annuloplast\$ with ring	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2005/03/21 13:52

	Document ID	Kind Code	Source	Issue Date	Pages	Image D
1	US 4042979 A		USPAT	19770823	5	US 4042
2	US 4489446 A		USPAT	19841225	8	US 4489
3	US 5306296 A		USPAT	19940426	24	US 5306
4	US 5549666 A		USPAT	19960827	9	US 5549
5	US 5674279 A		USPAT	19971007	22	US 5674
6	US 5769780 A		USPAT	19980623	10	US 5769
7	US 6010531 A		USPAT	20000104	57	US 6010
8	US 6125852 A		USPAT	20001003	24	US 6125
9	US 6165196 A		USPAT	20001226	24	US 6165
10	US 6250308 B1		USPAT	20010626	14	US 6250
11	US 20010034551 A1		US-PGP	20011025	15	US 2001
12	US 20010049558 A1		US-PGP	20011206	22	US 2001
13	US 6355030 B1		USPAT	20020312	47	US 6355
14	US 20020029783 A1		US-PGP	20020314	24	US 2002
15	US 20020042625 A1		US-PGP	20020411	25	US 2002
16	US 20020042621 A1		US-PGP	20020411	21	US 2002
17	US 6406420 B1		USPAT	20020618	45	US 6406
18	US 20020087169 A1		US-PGP	20020704	47	US 2002
19	US 20020087166 A1		US-PGP	20020704	47	US 2002
20	US 20020087148 A1		US-PGP	20020704	46	US 2002
21	US 20020087049 A1		US-PGP	20020704	46	US 2002
22	US 20020087048 A1		US-PGP	20020704	46	US 2002
23	US 20020095175 A1		US-PGP	20020718	46	US 2002
24	US 20020095167 A1		US-PGP	20020718	22	US 2002
25	US 20020116054 A1		US-PGP	20020822	25	US 2002
26	US 20020115994 A1		US-PGP	20020822	26	US 2002
27	US 6461366 B1		USPAT	20021008		
28	US 20020151961 A1		US-PGP	20021017		
29	US 6485489 B2		USPAT	20021126		
30	US 20020183766 A1		US-PGP	20021205		
31	US 20030040793 A1		US-PGP	20030227		
32	US 20030069570 A1		US-PGP	20030410		
33	US 20030078465 A1		US-PGP	20030424		
34	US 6565603 B2		USPAT	20030520		
35	US 20030102000 A1		US-PGP	20030605		
36	US 6599448 B1		USPAT	20030729		
37	US 20030158591 A1		US-PGP	20030821		
38	US 20030187362 A1		US-PGP	20031002	69	US 2003
39	US 20030199974 A1		US-PGP	20031023		
40	US 6651671 B1		USPAT	20031125	59	US 6651
41	US 20030229395 A1		US-PGP	20031211		
42	US 6673063 B2		USPAT	20040106		
43	US 20040006379 A1		US-PGP	20040108		

Detail Description Paragraph - DETX (39):

[0073] In one example, the annuloplasty ring of the present invention can be manufactured using a flexible material that is also elastic to comprise the second section. The elasticity of the ring would accommodate the expansion of the mitral annulus during relaxation of the left ventricle and accommodate contraction of the annulus during contraction of the left ventricle. In other words, the annulus would expand and contract, in addition to flexing, with the expansion and contraction of the left ventricle.

Claims Text - CLTX (1):

1. An annuloplasty ring for repairing a valve in a patient's heart, said annuloplasty ring comprising: (a) a first section for implanting adjacent to the valve; and (b) a second flexible section for implanting within a fat pad of an atrioventricular groove in the heart.

Claims Text - CLTX (2):

2. The annuloplasty ring of claim 1, wherein said second flexible section comprises a proximal end and a distal end and a means for joining the distal end to a needle.

Claims Text - CLTX (3):

3. The annuloplasty ring of claim 2, further comprising a needle having an attaching end with an outer diameter.

Claims Text - CLTX (4):

4. The annuloplasty ring of claim 3, wherein said means for joining the distal end to the needle comprising a frictional engagement.

Claims Text - CLTX (5):

5. The annuloplasty ring of claim 4, wherein said first section further comprises a first and second end, said first and second ends having an outer diameter; said annuloplasty ring further comprising: (a) a first means for joining the distal end of the second flexible section to the second end of the first section; and (b) a second means for joining the proximal end of the second flexible section to the first end of the first section.

Claims Text - CLTX (6):

6. The annuloplasty ring of claim 5, wherein said first means for joining comprises a frictional engagement and said second means for joining comprises a frictional engagement.

Claims Text - CLTX (7):

7. The annuloplasty ring of claim 6, wherein said outer diameters of said first and second ends are approximately equal to said inner diameter of said hollow inner portion, and said frictional engagement of said first means for joining is between said inner diameter of said hollow inner portion at said distal end and said outer diameter of said second end, and said frictional engagement of said second means for joining is between said inner diameter of said hollow inner portion at said proximal end and said outer diameter of said first end.

Claims Text - CLTX (8):

8. The annuloplasty ring of claim 5, further comprising: (a) an open configuration wherein said first section is attached to said second section by said second means for joining and said second end of said first section and said distal end of said second flexible section are unattached; (b) a closed configuration wherein said first section is attached to said second section by said first and second means for joining, thereby forming a loop; and (c) a surgical configuration wherein said first section is attached to said second section by said first means for joining and said second flexible section is attached to the needle by said means for joining said distal end of said second flexible section to said needle.

	Document ID	Kind Code	Source	Issue Date	Pages	Image D-
1	US 4042979 A		USPAT	19770823	5	US 4042
2	US 4489446 A		USPAT	19841225	8	US 4489
3	US 5306296 A		USPAT	19940426	24	US 5306
4	US 5549666 A		USPAT	19960827	9	US 5549
5	US 5674279 A		USPAT	19971007	22	US 5674
6	US 5769780 A		USPAT	19980623	10	US 5769
7	US 6010531 A		USPAT	20000104	57	US 6010
8	US 6125852 A		USPAT	20001003	24	US 6125
9	US 6165196 A		USPAT	20001226	24	US 6165
10	US 6250308 B1		USPAT	20010626	14	US 6250
11	US 20010034551 A1		US-PGP	20011025	15	US 2001
12	US 20010049558 A1		US-PGP	20011206	22	US 2001
13	US 6355030 B1		USPAT	20020312	47	US 6355
14	US 20020029783 A1		US-PGP	20020314	24	US 2002
15	US 20020042625 A1		US-PGP	20020411	25	US 2002
16	US 20020042621 A1		US-PGP	20020411	21	US 2002
17	US 6406420 B1		USPAT	20020618	45	US 6406
18	US 20020087169 A1		US-PGP	20020704	47	US 2002
19	US 20020087166 A1		US-PGP	20020704	47	US 2002
20	US 20020087148 A1		US-PGP	20020704	46	US 2002
21	US 20020087049 A1		US-PGP	20020704	46	US 2002
22	US 20020087048 A1		US-PGP	20020704	46	US 2002
23	US 20020095175 A1		US-PGP	20020718	46	US 2002
24	US 20020095167 A1		US-PGP	20020718	22	US 2002
25	US 20020116054 A1		US-PGP	20020822	25	US 2002
26	US 20020115994 A1		US-PGP	20020822	26	US 2002
27	US 6461366 B1		USPAT	20021008		
28	US 20020151961 A1		US-PGP	20021017		
29	US 6485489 B2		USPAT	20021126		
30	US 20020183766 A1		US-PGP	20021205		
31	US 20030040793 A1		US-PGP	20030227		
32	US 20030069570 A1		US-PGP	20030410		
33	US 20030078465 A1		US-PGP	20030424		
34	US 6565603 B2		USPAT	20030520		
35	US 20030102000 A1		US-PGP	20030605		
36	US 6599448 B1		USPAT	20030729		
37	US 20030158591 A1		US-PGP	20030821		
38	US 20030187362 A1		US-PGP	20031002	69	US 2003
39	US 20030199974 A1		US-PGP	20031023		
40	US 6651671 B1		USPAT	20031125	59	US 6651
41	US 20030229395 A1		US-PGP	20031211		
42	US 6673063 B2		USPAT	20040106		
43	US 20040006379 A1		US-PGP	20040108		

Detail Description Paragraph - DETX (8):

[0044] In one preferred form of the invention, and looking now at FIGS. 3-7, a first sized 120 is used. First sized 120 comprises a handle 130 and an adjustable mounting ring 140. Handle 130 preferably comprises two cylinders 150, 160 which are able to move relative to one another. Cylinder 150 is connected to mounting ring 140 by a drive cable 170 (shown in phantom). Drive cable 170 is in turn connected to a central bevel gear 180 (FIG. 7) in adjustable mounting ring 140. Rotation of central bevel gear 180 in turn causes the additional bevel gears 190 to rotate. These bevel gears 190 are coupled to threaded shafts 200. Adjustable mounting ring segments 210 are internally threaded and ride on the threaded shafts 200. The rotation of threaded shafts 200 causes mounting ring segments 210 to move radially and hence causes adjustable mounting ring 140 to ~~expand and contract~~ (i.e., to change in radial dimension). Accordingly, it will be seen that rotation of cylinder 150 relative to cylinder 160 results in a change in the geometry (i.e., the size) of adjustable mounting ring 140. Cylinder 160 (i.e., the one that is not connected to adjustable mounting ring 140 by drive cable 170) serves as the support portion of the handle and remains in a relatively fixed orientation with respect to adjustable mounting ring 140. Cylinder 160 may have a constant outer diameter or, alternatively, it may have a stepped outer diameter such as that shown in FIGS. 3 and 4. Handle 130 also has a size indicator 220 on the outside of cylinder 160 that shows the size of the tissue ~~annuloplasty~~ band after it has been properly sized.

Detail Description Paragraph - DETX (9):

[0045] As mentioned above, adjustable mounting ring 140 is (i) connected to cylinder 150 by drive cable 170, and (ii) fixed to cylinder 160. Adjustable mounting ring 140 comprises a central body 230 that contains the aforementioned bevel gears 180 and 190. These gears 180 and 190 are in turn coupled to the mounting ring segments 210 to which the tissue ~~annuloplasty~~ band 100 will be attached. These mounting ring segments 210 are attached to central body 230 by the threaded shafts 200. Accordingly, movement of the aforementioned bevel gear 180 via cable 170 causes the mounting ring segments 210 to ~~expand and contract~~ relative to central body 230. Hence, the tissue ~~annuloplasty~~ band 100 can be adjusted to the appropriate size for varying patient anatomies. Mounting ring segments 210 can have additional support, e.g., by lateral stays 240 interacting with each other. The outer edge 250 of each segment 210 preferably has a groove 260 in which the tissue ~~annuloplasty~~ band 100 is mounted.

Detail Description Paragraph - DETX (11):

[0047] The tissue ~~annuloplasty~~ band 100 (FIG. 2) is placed into groove 260 on adjustable mounting ring 140 (FIG. 12). Then the elastic ends 110A, 110B of axle 70 are attached to one another. This creates tension on the tissue, which keeps the tissue ~~annuloplasty~~ band 100 in the groove 260 on the mounting ring. Clamps, ties or sutures can be applied as necessary for increased stability.

Detail Description Paragraph - DETX (12):

[0048] Next, the appropriate size and shape of the tissue ~~annuloplasty~~ band 100 is determined. To do this, the tissue ~~annuloplasty~~ band 100, which is now mounted on adjustable mounting ring 140, is placed in the patient's left atrium and visually compared to the patient's mitral valve. Alternatively, the mitral valve may be measured directly. The surgeon then adjusts the size of tissue ~~annuloplasty~~ band 100 by turning cylinder 150 of handle 130 until tissue ~~annuloplasty~~ band 100 is appropriately sized. Any excess tissue is marked for later excision.

Detail Description Paragraph - DETX (13):

[0049] Next, sutures are placed through the patient's annulus and subsequently through the tissue ~~annuloplasty~~ band 100. The tissue ~~annuloplasty~~ band 100 is then guided into place with the assistance of sized 120 (or 120A). Tissue ~~annuloplasty~~ band 100 is then tied down into place, while it is still mounted on adjustable mounting ring 140, so as to maintain its shape during final seating. Once tissue ~~annuloplasty~~ band 100 has been tied into place, the

File Edit View Tools Window Help

	Document ID	Kind Code	Source	Issue Date	Pages	Image D-
1	US 4042979 A		USPAT	19770823	5	US 4042
2	US 4489446 A		USPAT	19841225	8	US 4489
3	US 5306296 A		USPAT	19940426	24	US 5306
4	US 5549666 A		USPAT	19960827	9	US 5549
5	US 5674279 A		USPAT	19971007	22	US 5674
6	US 5769780 A		USPAT	19980623	10	US 5769
7	US 6010531 A		USPAT	20000104	57	US 6010
8	US 6125852 A		USPAT	20001003	24	US 6125
9	US 6165196 A		USPAT	20001226	24	US 6165
10	US 6250308 B1		USPAT	20010626	14	US 6250
11	US 20010034551 A1		US-PGP	20011025	15	US 2001
12	US 20010049558 A1		US-PGP	20011206	22	US 2001
13	US 6355030 B1		USPAT	20020312	47	US 6355
14	US 20020029783 A1		US-PGP	20020314	24	US 2002
15	US 20020042625 A1		US-PGP	20020411	25	US 2002
16	US 20020042621 A1		US-PGP	20020411	21	US 2002
17	US 6406420 B1		USPAT	20020618	45	US 6406
18	US 20020087169 A1		US-PGP	20020704	47	US 2002
19	US 20020087166 A1		US-PGP	20020704	47	US 2002
20	US 20020087148 A1		US-PGP	20020704	46	US 2002
21	US 20020087049 A1		US-PGP	20020704	46	US 2002
22	US 20020087048 A1		US-PGP	20020704	46	US 2002
23	US 20020095175 A1		US-PGP	20020718	46	US 2002
24	US 20020095167 A1		US-PGP	20020718	22	US 2002
25	US 20020116054 A1		US-PGP	20020822	25	US 2002
26	US 20020116054 A1		US-PGP	20020822	26	US 2002
27	US 6461366 B1		USPAT	20021008	8	US 6461
28	US 20020151961 A1		US-PGP	20021017	52	US 2002
29	US 6485489 B2		USPAT	20021126	25	US 6485
30	US 20020183766 A1		US-PGP	20021205	8	US 2002
31	US 20030040793 A1		US-PGP	20030227	12	US 2003
32	US 20030069570 A1		US-PGP	20030410	32	US 2003
33	US 20030078465 A1		US-PGP	20030424	79	US 2003
34	US 6565603 B2		USPAT	20030520	15	US 6565
35	US 20030102000 A1		US-PGP	20030605	24	US 2003
36	US 6599448 B1		USPAT	20030729	12	US 6599
37	US 20030158591 A1		US-PGP	20030821	16	US 2003
38	US 20030187362 A1		US-PGP	20031002	69	US 2003
39	US 20030199974 A1		US-PGP	20031027	29	US 2003
40	US 6651671 B1		USPAT	20031125	59	US 6651
41	US 20030229395 A1		US-PGP	20031211	15	US 2003
42	US 6673063 B2		USPAT	20040106	16	US 6673
43	US 20040006379 A1		US-PGP	20040108	20	US 2004

Detail Description Paragraph - DETX (20):

[0064] In the embodiments described above, the implant member returns to its memory shape upon stress release (i.e., actuation of release mechanism 108). As the implant is inserted, the tissue and pulling forces placed on the device to pull it into position cause it to axially expand. Once in position, the release mechanism is actuated, thereby removing the pulling force and allowing the implant to axially contract toward its memory shape.

Detail Description Paragraph - DETX (24):

[0068] Referring to FIG. 8A, another embodiment of the invention is shown and generally indicated with reference numeral 200. Annuloplasty system 200 generally comprises an implant member 202, anchors comprising or in the form of surgical clips 204 coupled to ends of implant member 202, flexible members or wires 206, release mechanisms 208, which releasably couple the flexible members to implant member 202, and tissue piercing members or needles 210, which are secured to the flexible members or wires 206.

Detail Description Paragraph - DETX (35):

[0079] Referring to FIGS. 10A-10D, an exemplary mitral valve annuloplasty method using annuloplasty system 200 will be described. In general, implant member 202 is implanted onto the mitral valve annulus of the target mitral valve such that the implant member or wire is attached to the surface of the annular tissue. In this mitral valve annuloplasty example, the implant member or wire is secured along the posterior annulus with the ends of the implant member secured to the annulus at the two fibrous trigones.

Detail Description Paragraph - DETX (39):

[0083] The low profile characteristic of the implant as compared to conventional annuloplasty rings or bands reduces the amount or volume of prosthetic material that is exposed to blood flow. This can substantially reduce the need for post-operative anticoagulation therapy.

Detail Description Paragraph - DETX (40):

[0084] Although annuloplasty system 200 has been described with self-closing clip type anchors, other surgical clips can be used as anchors such as that disclosed in U.S. Pat. No. 5,972,024, which issued to Northrop, III et al. Further, sutures can be used to form the anchors as will be discussed in more detail below.

Detail Description Paragraph - DETX (44):

[0088] Referring to FIG. 11, an alternative tissue connector assembly suitable for use with system 200 to secure the implant member ends and/or loops to the valve tissue is shown. The tissue connector assembly 400 generally comprises a needle 106, tubular flexible member 104, clip or anchor 204 (all of which have been described above) and a remote release mechanism "R." Although the squeeze actuated release mechanism 208 is very effective, a remote release mechanism is especially advantageous where the operative space or field is limited such as in the case of valve annuloplasty. Various remote release mechanisms in accordance with the invention are illustrated in FIGS. 12A-12D, 13A-13D, and 14A-14D. Generally, the remote release mechanism "R" comprises a holding mechanism, such as the plurality of arms or wires 122 illustrated in FIGS. 2A-D, and a sheath or tubular member for holding the holding mechanism closed, such as tubular member 124 illustrated in FIGS. 2A-D and, therefore can be the same as release mechanism 108.

Claims Text - CLTX (2):

1. An annuloplasty system for repairing a valve in a patient's heart, said annuloplasty system comprising a surgical implant including a member having first and second end portions, said member further being adapted to form a partial ring along a portion of one of the valve annuluses of a patient's heart, said member being axially elastic, said implant further including first and second anchors extending from the end portions of the implant member and adapted to anchor the implant to the valve annulus.

US5N = 10/125, 811

	Document ID	Kind Code	Source	Issue Date	Pages	Image D-
4	US 5549666 A		USPAT	19960827	9	US 5549
5	US 5674279 A		USPAT	19971007	22	US 5674
6	US 5769780 A		USPAT	19980623	10	US 5769
7	US 6010531 A		USPAT	20000104	57	US 6010
8	US 6125852 A		USPAT	20001003	24	US 6125
9	US 6165196 A		USPAT	20001226	24	US 6165
10	US 6250308 B1		USPAT	20010626	14	US 6250
11	US 20010034551 A1		US-PGP	20011025	15	US 2001
12	US 20010049558 A1		US-PGP	20011206	22	US 2001
13	US 6355030 B1		USPAT	20020312	47	US 6355
14	US 20020029783 A1		US-PGP	20020314	24	US 2002
15	US 20020042625 A1		US-PGP	20020411	25	US 2002
16	US 20020042621 A1		US-PGP	20020411	21	US 2002
17	US 6406420 B1		USPAT	20020618	45	US 6406
18	US 20020087169 A1		US-PGP	20020704	47	US 2002
19	US 20020087166 A1		US-PGP	20020704	47	US 2002
20	US 20020087148 A1		US-PGP	20020704	46	US 2002
21	US 20020087049 A1		US-PGP	20020704	46	US 2002
22	US 20020087048 A1		US-PGP	20020704	46	US 2002
23	US 20020095175 A1		US-PGP	20020718	46	US 2002
24	US 20020095167 A1		US-PGP	20020718	22	US 2002
25	US 20020116054 A1		US-PGP	20020822	25	US 2002
26	US 20020115994 A1		US-PGP	20020822	26	US 2002
27	US 6461366 B1		USPAT	20021008	8	US 6461
28	US 20020151961 A1		US-PGP	20021017	52	US 2002
29	US 6485489 B2		USPAT	20021126	25	US 6485
30	US 20020183766 A1		US-PGP	20021205	8	US 2002
31	US 20030040793 A1		US-PGP	20030227	12	US 2003
32	US 20030069570 A1		US-PGP	20030410	32	US 2003
33	US 20030078465 A1		US-PGP	20030424	79	US 2003
34	US 6565603 B2		USPAT	20030520	15	US 6565
35	US 20030102000 A1		US-PGP	20030605	24	US 2003
36	US 6599448 B1		USPAT	20030729	12	US 6599
37	US 20030158591 A1		US-PGP	20030821	16	US 2003
38	US 20030187362 A1		US-PGP	20031002	69	US 2003
39	US 20030199974 A1		US-PGP	20031023	29	US 2003
40	US 6651671 B1		USPAT	20031125	59	US 6651
41	US 20030229395 A1		US-PGP	20031211	15	US 2003
42	US 6673063 B2		USPAT	20040106	16	US 6673
43	US 20040006379 A1		US-PGP	20040108	20	US 2004
44	US 20040039443 A1		US-PGP	20040226	24	US 2004
45	US 6702826 B2		USPAT	20040309	20	US 6702
46	US 20040055608 A1		US-PGP	20040325	24	US 2004



US 6702826 B2

(12) United States Patent Liddicoat et al.

(10) Patent No.: US 6,702,826 B2
(45) Date of Patent: *Mar. 9, 2004

(34) AUTOMATED ANNULAR PPLICATION FOR MITRAL VALVE REPAIR

4,841,960 A * 6/1985 Gerns 606/75
5,239,440 A * 8/1992 Kluweck 606/219
5,459,880 A * 9/1995 O'Connor 606/219
5,540,716 A * 7/1996 Kluweck 606/219
5,709,885 A * 6/1998 Nordrup, III 606/219
5,847,590 A * 5/1999 Quido 606/219
5,963,476 A * 1/1999 Quido 606/219
2002/0055167 A1 * 7/2002 Liddicoat et al. 606/151
2003/0171779 A1 * 8/2003 Adams et al. 606/219

(73) Assignee: Vascor, Inc., Wilmington, MA (US)

* cited by examiner

(*) Notes: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

Primary Examiner—John J. Calvert
Assistant Examiner—Shawn R. Hickey
(74) Attorney, Agent, or Firm—Prodicio & Pandicco

(57) ABSTRACT

A novel system for performing a heart valve annuloplasty. The system involves the use of a plication band. In one embodiment, the annulus of the valve is reduced by constriction of the plication band itself. More particularly, each plication band causes the tissue at two or more points which are spaced from one another by a distance which is dictated by the geometry of the plication band. Subsequent constriction of the plication band causes these points to move toward each other, thereby constricting the tissue trapped between these points and thus reducing the overall circumference of the valve annulus. In a second embodiment, the annulus of the valve is reduced by linking multiple plication bands to one another, using a linkage construct, and then using a shortening of the length of the linkage construct between each plication band so as to gather the tissue between each plication band, whereby to reduce the overall circumference of the valve annulus.

(21) Appl. No.: 09/883,283

(22) Filed: Jun. 22, 2001

(65) Prior Publication Date

US 2002/0042621 A1 Apr. 11, 2002

Related U.S. Application Data

(50) Provisional application No. 60/213,782, filed on Jan. 23, 2000.

(51) Int. Cl. A61B 17/064

(52) U.S. Cl. 606/151; 606/153; 606/157; 606/219

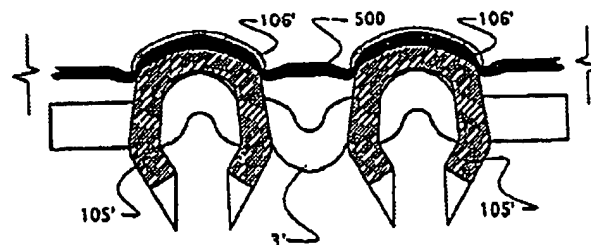
(53) Field of Search 606/151, 153, 606/155, 157, 156, 75, 219

(56) References Cited

U.S. PATENT DOCUMENTS

4,505,273 A 3/1981 Braun et al.

27 Claims, 11 Drawing Sheets



	Document ID	Kind Code	Source	Issue Date	Pages	Image D-
4	US 5549666 A		USPAT	19960827	9	US 5549
5	US 5674279 A		USPAT	19971007	22	US 5674
6	US 5769780 A		USPAT	19980623	10	US 5769
7	US 6010531 A		USPAT	20000104	57	US 6010
8	US 6125852 A		USPAT	20001003	24	US 6125
9	US 6165196 A		USPAT	20001226	24	US 6165
10	US 6250308 B1		USPAT	20010626	14	US 6250
11	US 20010034551 A1		US-PGP	20011025	15	US 2001
12	US 20010049558 A1		US-PGP	20011206	22	US 2001
13	US 6355030 B1		USPAT	20020312	47	US 6355
14	US 20020029783 A1		US-PGP	20020314	24	US 2002
15	US 20020042625 A1		US-PGP	20020411	25	US 2002
16	US 20020042621 A1		US-PGP	20020411	21	US 2002
17	US 6406420 B1		USPAT	20020618	45	US 6406
18	US 20020087169 A1		US-PGP	20020704	47	US 2002
19	US 20020087166 A1		US-PGP	20020704	47	US 2002
20	US 20020087148 A1		US-PGP	20020704	46	US 2002
21	US 20020087049 A1		US-PGP	20020704	46	US 2002
22	US 20020087048 A1		US-PGP	20020704	46	US 2002
23	US 20020095175 A1		US-PGP	20020718	46	US 2002
24	US 20020095167 A1		US-PGP	20020718	22	US 2002
25	US 20020116054 A1		US-PGP	20020822	25	US 2002
26	US 20020115994 A1		US-PGP	20020822	26	US 2002
27	US 6461366 B1		USPAT	20021008	8	US 6461
28	US 20020151961 A1		US-PGP	20021017	52	US 2002
29	US 6485489 B2		USPAT	20021126	25	US 6485
30	US 20020183766 A1		US-PGP	20021205	8	US 2002
31	US 20030040793 A1		US-PGP	20030227	12	US 2003
32	US 20030069570 A1		US-PGP	20030410	32	US 2003
33	US 20030078465 A1		US-PGP	20030424	79	US 2003
34	US 6565603 B2		USPAT	20030520	15	US 6565
35	US 20030102000 A1		US-PGP	20030605	24	US 2003
36	US 6599448 B1		USPAT	20030729	12	US 6599
37	US 20030158591 A1		US-PGP	20030821	16	US 2003
38	US 20030187362 A1		US-PGP	20031002	69	US 2003
39	US 20030199974 A1		US-PGP	20031023	29	US 2003
40	US 6651671 B1		USPAT	20031125	59	US 6651
41	US 20030229395 A1		US-PGP	20031211	15	US 2003
42	US 6673063 B2		USPAT	20040106	16	US 6673
43	US 20040006379 A1		US-PGP	20040108	20	US 2004
44	US 20040039443 A1		US-PGP	20040226	24	US 2004
45	US 6702826 B2		USPAT	20040309	20	US 6702
46	US 20040055608 A1		US-PGP	20040325	24	US 2004

repair of mitral valves, wherein the method can be employed to perform mitral valve repair via a partial or complete annuloplasty; either on an arrested heart or on a beating heart, with or without the use of cardiopulmonary bypass, or on a fibrillating heart.

Brief Summary Text - BSTX (37):

These and other objects of the present invention are addressed by the provision and use of a novel system and method for performing partial or complete mitral valve annuloplasty using a novel device that creates a measured plication of the mitral annulus. The device can be inserted into the left atrium via (1) a partial or complete sternotomy; (2) a right or left thoracotomy, with or without a thoracoscope; or (3) a central or peripheral vein via the right atrium and interatrial septum.

Detailed Description Text - DCTX (8):

The final deformed shape 100', and the difference between the un-deformed distance 102 and the deformed distance 102', can be varied, either by plication band design or by the design of the deployment tool which deforms the plication band. For mitral annuloplasty, the distance 102 is preferably between about 3 mm and 20 mm, with the distance 102' being about 20% to 70% of distance 102. However, these distances may vary outside of these ranges, particularly where the present invention is applied to other cardiac valves.

Detailed Description Text - DCTX (30):

Alternatively, the plication band of the present invention may be constructed of an elastic material such as a superelastic nickel titanium alloy (e.g., Nitinol) pre-formed in the desired final "contracted" shape. This shape can be the same as or similar to that shown in FIGS. 10-12. The plication band may then be deployed by actively expanding it, with an appropriate deployment tool, to a shape the same as or similar to that shown in FIGS. 7-9. The expanded plication band may then be advanced into annulus tissue and release; once released, the plication band will then elastically strain back into its original "contracted" shape.

	Document ID	Kind Code	Source	Issue Date	Pages	Image D-
1	US 4042979 A		USPAT	19770823	5	US 4042
2	US 4489446 A		USPAT	19841225	8	US 4489
3	US 5306296 A		USPAT	19940426	24	US 5306
4	US 5549666 A		USPAT	19960827	9	US 5549
5	US 5674279 A		USPAT	19971007	22	US 5674
6	US 5769780 A		USPAT	19980623	10	US 5769
7	US 6010531 A		USPAT	20000104	57	US 6010
8	US 6125852 A		USPAT	20001003	24	US 6125
9	US 6165196 A		USPAT	20001226	24	US 6165
10	US 6250308 B1		USPAT	20010626	14	US 6250
11	US 20010034551 A1		US-PGP	20011025	15	US 2001
12	US 20010049558 A1		US-PGP	20011206	22	US 2001
13	US 6355030 B1		USPAT	20020312	47	US 6355
14	US 20020029783 A1		US-PGP	20020314	24	US 2002
15	US 20020042625 A1		US-PGP	20020411	25	US 2002
16	US 20020042621 A1		US-PGP	20020411	21	US 2002
17	US 6406420 B1		USPAT	20020618	45	US 6406
18	US 20020087169 A1		US-PGP	20020704	47	US 2002
19	US 20020087166 A1		US-PGP	20020704	47	US 2002
20	US 20020087148 A1		US-PGP	20020704	46	US 2002
21	US 20020087049 A1		US-PGP	20020704	46	US 2002
22	US 20020087048 A1		US-PGP	20020704	46	US 2002
23	US 20020095175 A1		US-PGP	20020718	46	US 2002
24	US 20020095167 A1		US-PGP	20020718	22	US 2002
25	US 20020116054 A1		US-PGP	20020822	25	US 2002
26	US 20020115994 A1		US-PGP	20020822	26	US 2002
27	US 6461366 B1		USPAT	20021008	8	US 6461
28	US 20020151961 A1		US-PGP	20021017	52	US 2002
29	US 6485489 B2		USPAT	20021126	25	US 6485
30	US 20020183766 A1		US-PGP	20021205	8	US 2002
31	US 20030040793 A1		US-PGP	20030227	12	US 2003
32	US 20030069570 A1		US-PGP	20030410	32	US 2003
33	US 20030078465 A1		US-PGP	20030424	79	US 2003
34	US 6565603 B2		USPAT	20030520	15	US 6565
35	US 20030102000 A1		US-PGP	20030605	24	US 2003
36	US 6599448 B1		USPAT	20030729	12	US 6599
37	US 20030158591 A1		US-PGP	20030821	16	US 2003
38	US 20030187362 A1		US-PGP	20031002	69	US 2003
39	US 20030199974 A1		US-PGP	20031023	29	US 2003
40	US 6651671 B1		USPAT	20031125	59	US 6651
41	US 20030229395 A1		US-PGP	20031211	15	US 2003
42	US 6673063 B2		USPAT	20040106	16	US 6673
43	US 20040006379 A1		US-PGP	20040106	20	US 2004



US 20020042621 A1

(17) United States

(12) Patent Application Publication (10) Pub. No.: US 2002/0042621 A1

Liddicoat et al. (43) Pub. Date: Apr. 11, 2002

(34) AUTOMATED ANNULAR PPLICATION FOR (32) U.S. CL. 606/111
MITRAL VALVE REPAIR

(75) Inventors: John R. Liddicoat, Sewickley, PA (US); Gregory H. Lambrecht, Natick, MA (US); Richard B. Swanson, Winchester, MA (US); Steven B. WoolDon, Boston, MA (US)

(57) ABSTRACT

Correspondence Address:
Pundlich & Pundlich
470 Tetton Pond Road
Waltham, MA 02451-1914 (US)

(21) Appl. No.: 09/883,282

(22) Filed: Jan. 21, 2001

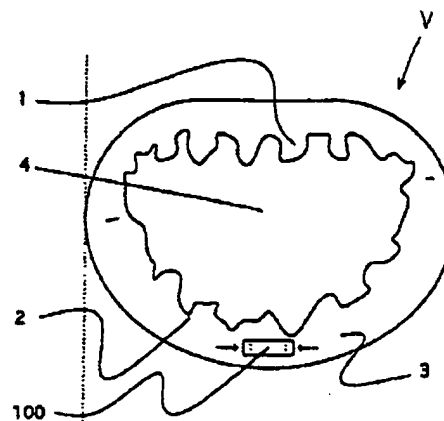
Related U.S. Application Data

(63) Non-provisional of provisional application No. 60/213,782, filed on Jan. 23, 2000.

Publication Classification

(51) Int. Cl. A61B 17/08

A novel system for performing a heart valve annuloplasty. The system involves the use of a plication band. In one embodiment, the annulus of the valve is reduced by constriction of the plication band itself. More particularly, each plication band enters the tissue at two or more points which are spaced from one other by a distance which is dictated by the geometry of the plication band. Subsequent constriction of the plication band causes these points to move toward each other, thereby constricting the tissue trapped between these points and thus reducing the overall circumference of the valve annulus. In a second embodiment, the annulus of the valve is reduced by linking multiple plication bands to one other, using a linkage construct, and then using a shortening of the length of the linkage construct between each plication band so as to gather the tissue between each plication band, whereby to reduce the overall circumference of the valve annulus.



Patent Application Publication Apr. 11, 2002 Sheet 8 of 11 US 2002/0042621 A1